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10/663,026	09/15/2003	Harlan T. Beverly	P16580	2544

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EXAMINER	
GOODCHILD, WILLIAM J	

ART UNIT	PAPER NUMBER
2445	

NOTIFICATION DATE	DELIVERY MODE
11/27/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

krvuspto@ipmatters.com

Office Action Summary	Application No.	Applicant(s)	
	10/663,026	BEVERLY ET AL.	
	Examiner	Art Unit	
	WILLIAM J. GOODCHILD	2445	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 July 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,7-20 and 22-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5, 7-20 and 22-39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 11-13 and 36-38 are objected to because of the following informalities: The claims are dependent on canceled claims. Appropriate correction is required.

Claim Rejections - 35 USC § 103

1. Claims 1-5, 7-20 and 22-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stevens, ("TCP/IP Illustrated, Volume 1"), and further in view of Aweya et al., (US Patent No. 7,047,312), (hereinafter Aweya) and Boyd et al., (US Publication No. 2004/0049580), (hereinafter Boyd).

Regarding claims 1, 15 and 26, Stevens discloses establishing an active connection adapted to send packets of data between a host and a destination [Stevens, chapter 20, figure 20.1, step 1];

receiving from the destination a first window value representing a first quantity of data packets [Stevens, chapter 20, figure 20.1, step 2];

sending packets of data from said host to said destination [Stevens, chapter 20, figure 20.1, steps 4-6];

receiving an acknowledgment from said destination for each packet of data received by said destination wherein said first window value represents a limit imposed on said host by said destination on the quantity of data packets sent from said host to said destination and lacking an acknowledgment of being received by destination [Stevens, chapter 20, figure 20.1, steps 7-8]; and

limiting the number of packets sent by said host [Stevens, chapter 20, figure 20.1, step 8], but not acknowledged as received by said destination, to a second quantity of data packets less than said first window value wherein said second quantity represents a limit imposed by said host on the quantity of data packets sent from said host to said destination and lacking an acknowledgment of being received by destination [Stevens, chapter 20, figure 20.1, steps 7-8].

Stevens does not specifically disclose wherein said second quantity is a function of the number of active connections of the host;

establishing a plurality of active direct memory access connections between said host and a plurality of specified memory locations of a plurality of destinations; sending a plurality of messages to specified memory locations of the destinations of the direct memory access connections wherein each message comprises a plurality of data packets; receiving message acknowledgments, each message acknowledgment being sent by a destination for each message received by the destination; and establishing a plurality of message limits, each message limit imposing a separate limit for each direct memory access connection on the quantity of messages sent from said host to the

specified memory location of the direct memory access connection associated with the message limit and lacking a message acknowledgment of being received by the destination of the direct memory access connection associated with the message limit.

However, Aweya in the same field of endeavor discloses reducing the sliding window based on the congestion related to the number of active connections [Aweya, column 6, lines 20-29].

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the number of active connections in order to allow the target machine to update the sliding window based on all packets being received.

Further, Boyd discloses an RDMA work request to read a virtually contiguous memory space on a remote node [Boyd, paragraph 76 and figure 19, multiple hosts, multiple destinations].

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate RDMA to remote destinations in order to allow data to move directly form the memory of one computer to that of another computer without involving the operating system.

Boyd further discloses, sending a plurality of messages to specified memory locations of the destinations of the direct memory access connections wherein each message comprises a plurality of data packets [Boyd, paragraph 122];
receiving message acknowledgments, each message acknowledgment being sent by a destination for each message received by the destination [Boyd, paragraph 122]; and establishing a plurality of message limits, each message limit imposing a separate limit for each direct memory access connection on the quantity of messages sent from said host to the specified memory location of the direct memory access connection associated with the message limit and lacking a message acknowledgment of being received by the destination of the direct memory access connection associated with the message limit [Boyd, paragraph 122].

Regarding claim 16, Stevens-Aweya-Boyd further discloses the data storage comprises a magnetic storage medium [Aweya, column 6, lines 20-29].

Regarding claims 2, 17 and 27, Stevens-Aweya-Boyd further discloses wherein the connection is a Transmission Control Protocol connection between the host and the destination [Stevens, Chapter 20, page 275, Introduction] and wherein said first window value is a Transmission Control Protocol send window value [Stevens, chapter 20, figure 20.1, steps 1-3].

Regarding claims 3, 18 and 28, Stevens-Aweya-Boyd further discloses establishing a

plurality of active connections between the host and a plurality of destinations [Aweya, column 6, lines 30-36];

receiving from each destination a first window value representing a first quantity of data packets for the connection [Stevens, chapter 20, figure 20.1, steps 1-3];

sending packets of data from said host to each destination [Stevens, chapter 20, figure 20.1, steps 4-6];

receiving an acknowledgment from each destination for each packet of data received by each destination [Stevens, chapter 20, figure 20.1, steps 4-16] wherein the first window value of each connection represents a limit imposed on said host by the destination of the connection on the quantity of data packets sent from said host to the destination of the connection and lacking an acknowledgment of being received by the destination of the connection [Stevens, chapter 20, figure 20.1, steps 7-8]; and

limiting the number of packets sent by said host to each connection, but not acknowledged as received by the destination of each connection, to a second quantity of data packets less than the window value of the connection [Stevens, chapter 20, figure 20.1, steps 7-8];

wherein the second quantity of each connection which is less than the window value of the connection is based, at least in part, on the number of active connections of the host [Aweya, column 6, lines 20-29].

Regarding claims 4, 19 and 29, Stevens-Aweya-Boyd further discloses wherein said host has a plurality of Transmission Control Protocol connections [Aweya, column 6,

lines 9-19], each Transmission Control Protocol connection having a Protocol Control Block which stores a Transmission Control Protocol send window value and a virtual window value less than said Transmission Control Protocol send window value [Aweya, column 6, lines 9-19] wherein each virtual window value limits the number of packets sent by said host, but not acknowledged as received by the destination of each Transmission Control Protocol connection, to a second quantity of data packets defined by the virtual window value of the Transmission Control Protocol connection [Aweya, column 6, lines 20-29].

Regarding claims 5, 20 and 30, Stevens-Aweya-Boyd further discloses in response to the destination reducing the size of the Transmission Control Protocol send window value to a third quantity less than the second quantity, limiting the number of packets sent by said host, but not acknowledged as received by said destination, to a fourth quantity of data packets no greater than the reduced size of the Transmission Control Protocol send window value [Stevens, chapter 20, figure 20.1, steps 1-10].

Regarding claims 7, 22 and 32, Stevens-Aweya-Boyd further discloses each direct memory access connection includes a network interface between an application of said host and a network connecting the host to the plurality of destinations and wherein said network interface includes a queue for each direct memory access connection and adapted to queue messages to be sent through the direct memory access connection associated with each queue [Boyd, paragraph 122], and

wherein said each sending of a message to specified memory location of the destination of a direct memory access connection includes queuing the message in the network interface queue associated with the direct memory access connection [Boyd, paragraphs 122 and 69-74]; and

wherein the queuing of messages in the network interface queue associated with a direct memory access connection is suspended when the quantity of messages sent from said host to the specified memory location of the associated direct memory access connection and lacking a message acknowledgment of being received by the destination of the associated direct memory access Connection reaches the separate message limit imposed on the direct memory access connection associated with the network interface queue [Boyd, paragraphs 122 and 69-74].

Regarding claims 8, 23 and 33, Stevens-Aweya-Boyd further discloses the queuing of messages in the network interface queue associated with a direct memory access connection is resumed when the quantity of messages sent from said host to the specified memory location of the associated direct memory access connection and lacking a message acknowledgment of being received by the destination of the associated direct memory access connection is less than the separate message limit imposed on the direct memory access connection associated with the network interface queue [Boyd, paragraph 122].

Regarding claims 9, 24 and 34, Stevens-Aweya-Boyd further discloses the packet sending connection is a Transmission Control Protocol connection between the host and the destination and wherein each direct memory access connection is a Remote Direct Memory Access connection between the host and the destination of the direct memory access connection [Boyd, paragraph 7] and
each message is a Remote Direct Memory Access message [Boyd, paragraphs 48 and 77].

Regarding claims 10, 25 and 35, Stevens-Aweya-Boyd further discloses said network interface has a pool of empty messages which imposes a limit on the total quantity of messages sent from said host to all the specified memory locations of all the direct memory access connections and lacking a message acknowledgment of being received by the destination of the associated direct memory access connection and wherein each message limit is less than the network interface pool of empty messages [Boyd, paragraphs 119-122].

Regarding claims 11 and 36, Stevens-Aweya-Boyd further discloses each message limit is based, at least in par, on the number of active direct memory access connections of the host [Boyd, paragraphs 119-122].

Regarding claims 12 and 37, Stevens-Aweya-Boyd further discloses changing the size of a message limit of an active direct memory access connection prior to sending at

least one message through the associated direct memory access connection [Boyd, paragraphs 119-123].

Regarding claims 13 and 38, Stevens-Aweya-Boyd further discloses each message limit is based, at least in par, on the number of active direct memory access connections of the host [Boyd, paragraphs 119-122].

Regarding claims 14 and 39, Stevens-Aweya-Boyd further discloses changing the size of the second quantity of packets limiting the number of packets sent by the host but not acknowledged as received by the destination prior to sending at least one packet [Stevens, chapter 20, figure 20.1, steps 1-10].

Response to Arguments

2. Applicant's arguments filed 07/16/2009 have been fully considered but they are not persuasive.

A - Applicant argues “Instead, it is the Examiner's position that "Boyd further discloses ... establishing a plurality of message limits, each message limit imposing a separate limit for each direct memory access connection on the quantity of messages sent from said host to the specified memory location of the direct memory access connection associated with the message limit and lacking a message acknowledgment of being received by the destination of the direct memory access connection associated with the

message limit" citing Boyd, paragraph 122. The applicants respectfully disagree. It is believed that the Examiner's citation to the Boyd reference refers to the discussion of a Maximum Remote Direct Memory Access (MRDMA) field 1120 which is described as the "maximum number of outstanding RDMA Read Requests from the remote socket." It is believed that the term RDMA Read Requests in the context refers to packets, not messages. Accordingly, it is believed that the cited Maximum Remote Direct Memory Access (MRDMA) field describes maximum number of outstanding read request packets, not messages, from the remote socket. Accordingly, it is respectfully submitted that the Examiner's citations to the Stevens, Aweya and Boyd references, considered alone or in combination, have no teaching or suggestion of "establishing a plurality of message limits, each message limit imposing a separate limit for each direct memory access connection on the quantity of messages sent from said host to the specified memory location of the direct memory access connection associated with the message limit and lacking a message acknowledgment of being received by the destination of the direct memory access connection associated with the message limit" as required by claim 1.”.

A – The Examiner disagrees: Boyd discloses limiting the number off packets between devices [Boyd, paragraph 122], and in limiting the number of packets, Boyd is limiting the number of messages [Boyd, paragraphs 5, 9, 48 and 52, these paragraphs discuss that a message is broken up into packets to be sent, and reassembled as a message

when received. As such, by limiting the number of packets, the number of messages is limited by the number of packets that can be accepted at that time].

Conclusion

3. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Examiner's Note: Examiner has cited particular paragraphs / columns and line numbers in the reference(s) applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings of the art and are applied to specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant in preparing responses, to fully consider the references in entirety as potentially teaching all or part

of the claimed invention, as well as the context of the cited passages as taught by the prior art or relied upon by the examiner.

Should applicant amend the claims of the claimed invention, it is respectfully requested that applicant clearly indicate the portion(s) of applicant's specification that support the amended claim language for ascertaining the metes and bounds of applicant's claimed invention

Any inquiry concerning this communication or earlier communications from the examiner should be directed to WILLIAM J. GOODCHILD whose telephone number is (571)270-1589. The examiner can normally be reached on Monday - Friday / 8:00 AM - 4:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivek Srivastava can be reached on (571) 272-7304. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

WJG
11/17/2009

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